UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/538,396	03/29/2000	Pramod B. Mahajan	1116	6440

27310 7590 11/19/2001

PIONEER HI-BRED INTERNATIONAL INC.
7100 N.W. 62ND AVENUE
P.O. BOX 1000
JOHNSTON, IA 50131

EXAMINER
IBRAHIM, MEDINA AHMED

ART UNIT	PAPER NUMBER
1638	9

DATE MAILED: 11/19/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/538,396	MAHAJAN ET AL.	
	Examiner	Art Unit	
	Medina Ibrahim	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2000 and 19 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) *9-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3,4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Receipt is acknowledged of Applicant's response to the requirement for restriction filed 08/31/01. Applicant elected Group I, with traverse, corresponding to claims 1-8. Applicant's election with traverse is acknowledged. The traversal is on the ground(s) that the inventions I and III, or II and III are related and have been disclosed as capable of use together. Applicants assert that the three Groups can be examined together without search burden. This is not found persuasive for the reasons of record. Groups I, II, and III are independent and patentably distinct inventions as discussed in the last Action. Applicants have provided no evidence that inventions I, II and III are not patentable over each. In addition, both the literature and sequence search of Groups I-III are divergent , and searching them together will pose series burden on the Examiner, even if some of the search overlap. Therefore, the restriction requirement is still deemed proper and is made FINAL.

Claims 1-8 are under examination. Claims 9- 11 are withdrawn as being directed to non-elected inventions.

Objections

The specification is objected to because of the following informalities: for example, page 62, line 10 cites hyperlinks directed to an Internet address. The use of hyperlink is not permitted under USPTO current policy because the contents of such links are subject to a change. Therefore, New Matter might be constant problem.

Sequence Listing

1. Applicant's CRF and paper sequence listing have been entered.

Information Disclosure Statement

2. Initialed and dated copies of Applicant's IDS form 1449, Paper Nos. 3 and 4 are attached to the instant Office action.

Drawings

3. No drawings were filed in the instant application.

Claim Rejections - 35 USC § 101 Utility

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-8 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a credible asserted utility or a well established utility. The claims are drawn to polynucleotides having at least 80% sequence identity to SEQ ID NO: 1, or a polynucleotide sequence amplified from a *Zea mays* nucleic acid library using primers which selectively hybridize to loci within SEQ ID NO:1, or partially complementary sequences, hybridizing sequences, or fragments of at least 30 contiguous nucleotides thereof. No function of said polynucleotides are recited. Applicants assert that a polynucleotide having 80% sequence identity to SEQ ID NO:1 would have Rad50 activity. However, it is unclear what would be the utility of said polynucleotide if the 20% lack of identity falls in region crucial for the Rad50 activity.

Applicants asserted that the nucleotide sequence of SEQ ID NO:1 encoding SEQ ID NO:2 has the utility of encoding a polypeptide having Rad50 activity. However, based upon Applicant's disclosure, the claims do not meet the utility requirements under the current utility guidelines for the following reasons: 1) the predicted function is based solely upon sequence comparison with known Rad50 polynucleotide/protein from the prior art (pages 2, Examples 1-2). Applicants provided no evidence that SEQ ID NO:2 has Rad50 activity.2) the specification provides no guidance as to where the catalytic domain of polypeptide having Rad50 or SEQ ID NO:2 is located. 3) No data that relates SEQ ID NO: 1 or SEQ ID NO:2 to Rad 50 activity has been shown. A sequence search result indicates that SEQ ID NO:2 shares 31.7% sequence identity with a known Rad50 protein (see attached Sequence Search Result, Accession no. U66887, pages 29-30). However, the state of the art as exemplified by Bork et al suggests that a 31.7% of sequence identity of Applicant's SEQ ID NO:2 with the known protein is insufficient to predictably determine the function of Applicant's protein. Bork et al (Genome Research, Vol. 10, 2000, pp. 398-400) teaches the pitfalls associated with comparative sequence analysis for predicting protein function because of known error margins for high-through put computational methods. Bork specifically teaches that computational sequence analysis is far from perfect, despite the fact that sequencing itself is highly automated and accurate (pp. 398, col. 1). One of the reasons of inaccuracy is that the quality of data in public databases is still in sufficient. This is particularly true for data relating to protein function. Protein function is context dependent, and both molecular and cellular aspects must be considered (pp. 398, col. 2). Conclusions from

comparison analysis are often stretched with regard to protein products (pp. 398, col. 3). Furthermore, although gene annotation via sequence data base searches is already routine, even here the error rate is considerable (pp. 399, col. 2). Most features predicted with an accuracy of greater than 70% are of structural nature and, at best, only indirectly imply certain functionality (pp. 399, Table 1 legend). Applicants should note that SEQ ID NO:1 has 31.7% to the known Rad50 protein of the prior art, which is much less than Borks' 70%. As more sequences are added to data bases and as errors accumulate and propagate, it becomes more difficult to infer correct function from the many possibilities revealed by a database search (pp. 399, paragraph bridging columns 2 and 3). Bork cautions that, although current methods seem to capture important features and define general trends, 30% of structure-function features are missing or predicted inaccurately. This must be kept in mind when processing the results (pp. 400, paragraph bridging columns 1 and 2). See, also Lazar et al (Molecular and Cellular Biology, March 1988, Vol. 8, No. 3, pp. 1247-1252 (U)) teaches a mutation of aspartic acid 47 and leucine 48 of a transforming growth factor alpha results in different biological activities (Title). Broun et al (Science, 13 November 1998, Vol. 282, pp. 131-133 (W)) teaches as few as four amino acid substitutions can convert an oleate 12-desaturase activity (Abstract). Therefore, it is unclear if SEQ ID NO:2 has Rad50 activity.

While Applicant is not required to provide empirical data to verify the Rad50 activity by Applicant's SEQ ID NO:2, a functional assignment based upon sequence alignments should be a starting point for determining a particular activity of a protein, and should not replace empirical

verification of a tentative functional assignment. It is apparent that further research not considered to be routine would be required before one skilled in the art would know how to use Applicant's SEQ ID NO:1 encoding SEQ ID NO:2. Therefore, the immediate benefit of Applicant's invention is to the public is unclear. It has been established in the courts that a utility which requires or constitutes carrying further research to identify or reasonably confirm a "real world" context of use is not a substantial utility.

"The basic quid pro quo contemplated by the Constitution and the Congress fro granting a patent monopoly is the benefit derived by the public from an invention with substantial utility. Unless and until a process is refined and developed to this point---where specific benefit exist in currently available form---there is insufficient justification for permitting an applicant to engross what may prove to be a broad field". *(Brenner v. Manson,* 383 U.S. 519 (1996*)*).

While protein having Rad50 activity would have substantial utility to the public, it is unclear whether SEQ ID NO:2 has Rad50 activity. Therefore, given the lack of a disclosed functional domain required for Rad50 activity; the lack of empirical data that relates SEQ ID NO:2 to Rad50 activity; the unpredictability in determining protein function by sequence comparison alone, as evidenced by Bork et al; the low sequence identity between Applicants' SEQ ID NO:2 and the prior art sequence, one skilled in the art would not conclude that SEQ ID NO:2 has Rad50 activity, or has utility under current utility guidelines (see Utility Examination Guidelines published in Federal Registry/Vol. 66, No.4/Friday, January 5, 2001/Notices; p. 1092-1099).

Regarding the claims drawn to polynucleotide having at least 80% sequence identity to SEQ ID NO:1, partially complementary sequences, or a 30 contiguous nucleotides thereof would not have utility, since SEQ ID NO:1 encoding SEQ ID NO:2 does not have utility as discussed above. Applicants should note that no working examples of a sequence having 80%, hybridizing sequences, partially complementary sequences, or a 30 contiguous nucleotides thereof having Rad50 activity have been disclosed in the specification.

Furthermore, there is no well established for the claimed SEQ ID NO:1-2, since there is no utility for probes, primers or antibodies to the expressed gene product of a gene having no known function. Applicant should note that the polynucleotide of claim 1(f) may not hybridize with the polynucleotide of 1(b) due to codon degeneracy. Therefore, because of the reasons discussed above, the claimed sequences do not have a real-world use and therefore lack utility.

Claim Rejections - 35 USC § 112, 1st paragraph

Claims 1-8 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a credible asserted utility or a well-established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention, without undue experimentation.

Written Description

Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the

claimed invention. Claim 1, part (c) is drawn to a polynucleotide having sequence amplified from a Zea mays nucleic acid library. No specific chemical or physical characteristics were disclosed for other polynucleotide sequences having sequence amplified from a Zea mays nucleic acid library. The claim encompasses undiscovered genes and undisclosed regions of Zea mays nucleic acid library outside of SEQ ID NO:1 which applicant is not in possession at the time of filing. Accordingly, there is lack of adequate description to inform a skilled artisan that Applicant was in possession of the claimed invention at the time of filing. See, Written Description Examination Guidelines published in Federal Registry/Vol. 66, No.4/Friday, January 5, 2001/Notices).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Boudet et al (US 5,451, 514 (A)).

The scope of the claims (claim 1, parts (d) and (f)) encompass nucleotide sequences which would read on a 2-nucleotide sequence, and/or are not fully complimentary; host cells, monocot and dicot plants comprising said polynucleotide, sense and antisense nucleotide sequences and a promoter. The claims read on a polynucleotide with 2-bases, since any two bases would hybridize and would be complementary to the claimed polynucleotide.

Boudet et al teach an isolated nucleic acid sequence from Zea mays, sense and antisense expression of said nucleic acid sequence in a monocot and in dicot plant of claim 7, a transgenic seed, and a promoter (see columns 9-14) ; said nucleic acid would inherently comprise the claimed 2-base polynucleotide.

Remarks

SEQ ID NO:1 encoding SEQ ID NO:2 is free of the prior art.

No claim is allowed.

Papers relating to this application may be submitted to Technology Sector 1 by facsimile transmission. Papers should be faxed to Crystal Mall 1, Art Unit 1638, using fax number (703) 308-4242. All Technology Sector 1 fax machines are available to receive transmissions 24 hrs/day, 7 days/wk. Please note that the faxing of such papers must conform with the Notice published in the Official Gazette, 1096 OG 30, (November 15, 1989).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Medina a. Ibrahim whose telephone number is (703) 306-5822. The Examiner can normally be reached Monday -Tuesday from 8:00AM to 4:00PM and Wednesday-Thursday from 9:00AM to 3:00 PM .

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Paula Hutzell, can be reached at (703) 308-4310.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0196.

November 13, 2001

mai

PHUONG T. BUI
PRIMARY EXAMINER